SECTION VI. TRANSPORTATION

A. INTRODUCTION

The City's transportation system consists of several components including; roadways, sidewalks, bikeways, mass transit (bus and rail) and the municipal airport. To be effective, the Master Plan must be comprehensive in that it considers and values each of these transportation modes. Similarly, the City's roadway system consists of various elements, each of which is dependent on each other to operate safely and efficiently. Consideration must be given to how various roadways function, how they connect to each other, how access is managed, and how roadways operate.

This Transportation Section encompasses consideration of the full range of modes of transportation including; air, rail, transit, pedestrian, bicycle, and the City's roadway system. Transportation goals are articulated within this Section relating to the modes of transportation. With regard to the City's roadway system, this Section provides a discussion on the functional classification system, roadway connectivity, traffic calming, access management, and traffic operations. This Section also includes detailed proposals for the enhancement of pedestrian and bicycle mobility, discussion on both intra-city as well as intercity bus service, consideration of future rail service, as well as reference to the findings and recommendations from the recent Airport Master Plan

Policies and recommendations to guide the implementation of the transportation improvements complete this Section of the Master. The recommended actions include discussion on the transportation-related improvements for the Opportunity Corridor, as well as which roadways need to be designed to process vehicular traffic and which roadways should be designed to discourage through traffic.

B. TRANSPORTATION GOALS

The overall goal is to plan and promote the development, and maintenance of a comprehensive transportation system serving the community, inclusive of residents of the City of Concord as well as employees who work within the City, and visitors with destinations in the City**.** Transportation planning should be carried out in a manner consistent with the City's anticipated future needs and resources, coordinated with State and regional plans, and inclusive of plans for highways, bikeways, sidewalks and pedestrian ways, as well as mass transit, bus, rail, and the municipal airport. The specific transportation goals, not in priority order, are:

1. Promote a roadway system that encourages the appropriate use of the City's street system reducing traffic volumes and travel speeds on local streets and within residential neighborhoods, and relieving congestion on some of the City's major travel routes.

2. Establish a multi-modal approach to the City's transportation system, inclusive of bus, rail, and air travel, as well as pedestrian and bicycle travel, in order to assist in the reduction of dependence on automobiles for travel, and thereby reducing the need to increase the capacity of the roadway system.

3. Plan, develop, and maintain a system of bicycle and pedestrian ways serving the residents of the City, including linkages among neighborhoods, between neighborhoods and the open space trail network, and with bus and future rail transportation.

4. Provide for interconnectivity among transportation modes.

5. Coordinate land use planning with transportation planning to ensure that the land use does not overburden the capacity of, or exceed acceptable levels of service within, the City's transportation system, so that land development and related transportation improvements are coordinated as to timing, so that individual components of the transportation system are appropriately utilized, and so that the ability to expand the transportation system is preserved where necessary.

6. Promote the implementation of the major highway and transportation improvements as proposed within this Transportation Section of the Master Plan.

7. Provide for the enhancement of the aesthetics associated with any planned transportation infrastructure improvements.

8. Provide for the safety of all motorists, pedestrians, bicyclists, and travelers on and within the City's transportation system through the adoption and implementation of appropriate design standards for transportation improvements.

9. Promote the management of traffic operations on the roadway system by maintaining acceptable overall and peak hour levels of service on the arterial and collector streets, by improving the efficiency of the existing roadway system, and by the timely implementation of traffic operational improvements

10. Seek the cooperation of the New Hampshire Department of Transportation and the Central New Hampshire Regional Planning Commission in monitoring and evaluating traffic flow and safety problems on State and federal highways, and in coordinating transportation planning within the City of Concord.

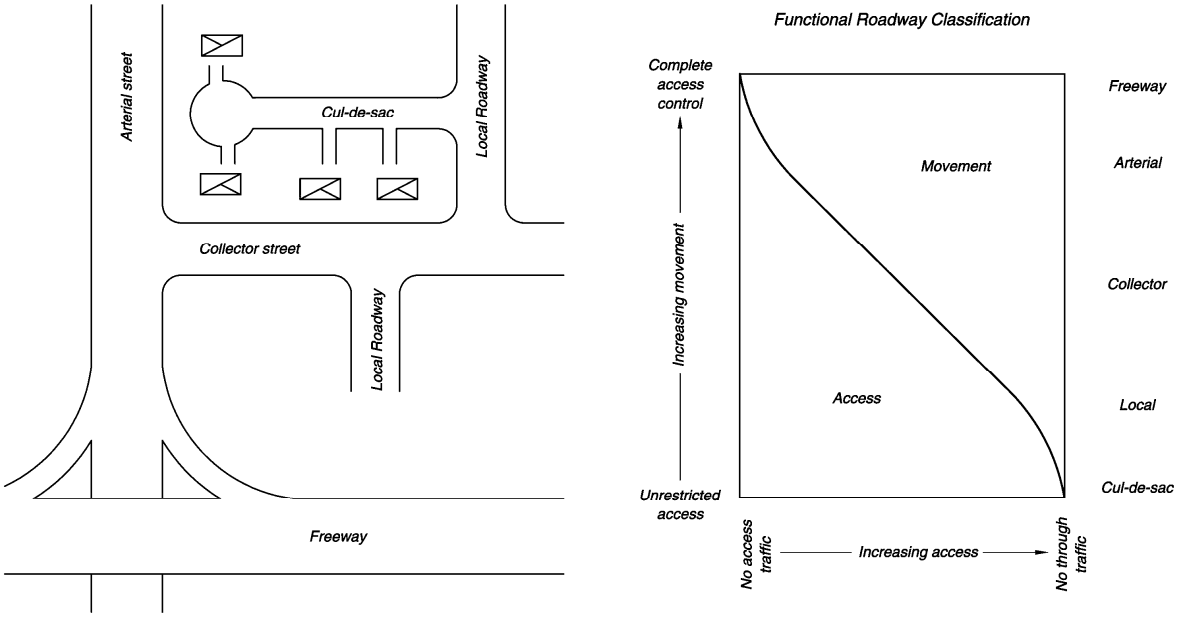
11. Seek adequate funding from public and private sources including through grants, fees, and exactions to support the expansion, improvement, operation, and maintenance of the transportation system.

C. STREET AND HIGHWAY FUNCTIONAL CLASSIFICATION

As depicted in Figure VI-1 below, the typical roadway functional classification system is comprised of a hierarchy of roadway types. This hierarchy includes local streets, collector streets, arterial roadways, and highways. Each type of facility provides various levels of access and traffic movement. Highways and arterial roadways are designed to process high volumes of traffic while access to adjacent land use is often limited. On the other hand, local roadways are designed to accommodate low traffic volumes and low travel speeds with a primary function of providing access. A collector roadway, as the name suggests, collects traffic from local streets and distributes it to the arterial system.

Therefore, local streets should only intersect collector streets or other local streets. Collector streets intersect local streets and arterials, while arterials intersect collector streets or highways. To accommodate the safe and efficient movement of traffic intersecting roadways should not differ by more than one functional class, meaning that local roadways should not intersect with arterial roadways or highways. The graphic provided on the following page shows the relationship between access and movement for the different functional classifications.

Figure VI-1. Functional Roadway Classification



Source: Vanasse Hangen Brustlin, Inc. (VHB)

Streets are functionally classified based on a number of variables including the origin or destination of the traffic on the street, traffic volumes, speed, abutting land use and access requirements, as well as physical design features. Two key variables are through versus local traffic, and the amount of access provided to abutting land uses. An interstate highway, the principal purpose of which is to carry through traffic, is at one end of the continuum, while at the opposite end of the continuum is the local street, the principal purpose of which is to provide access to abutting land uses.

1. Functional Classification System Components

The functional classification system components for Concord are defined as follows:

a. **Interstate Highways** - These are controlled access, divided highways with at least four travel lanes, and all intersections are grade-separated interchanges with on and off ramps. Average daily traffic volumes (ADT) may exceed 70,000 trips per day. Posted speed limits are generally between 55 and 65 miles per hour.

b. **Major Arterials** - A major arterial generally will have a minimum of four travel lanes with traffic volumes ranging from 16,000 to 30,000 ADT. Posted speed limits should range between 35-50 mph. The principal function of a major arterial is to carry cross town and

regional traffic. Access from abutting land uses should be strictly controlled and on-street parking should be prohibited.

c. **Minor Arterials** - Minor arterials generally carry traffic volumes between 8,000 and 16,000 ADT at operating speeds of 30 to 50 mph. They will usually consist of two travel lanes, that may be increased to three or four lanes to handle locally heavy traffic. Their principal purpose is to provide intra-city connections between neighborhoods and commercial areas, and to provide access to the regional traffic network. Access to these streets is controlled to maintain adequate levels of service and safe operating conditions. On-street parking should be allowed only in limited circumstances in older urban areas without adequate off-street parking.

d. **Major Collectors -** Major collectors typically carry between 2,500 to 12,000 ADT on two lanes of travel way. The purpose of the major collectors is to provide access from significant areas of residential, commercial and industrial activity to the arterial network. Access to these streets should be controlled to maintain adequate levels of service and safe operating conditions. On-street parking should be discouraged.

e. **Minor Collectors -** These are two lane roads similar in nature to urban and rural collectors. However, these roads generally carry more traffic than would be expected for rural collectors, but trip lengths are generally longer than found on the typical urban collector. These roads generally carry a higher percentage of intercity and cross town trips than would normally be expected on a roadway of this type and volume. On-street parking should be discouraged.

f. **Urban Collectors** - These are two lane roads designed to move traffic through and out of dense residential, commercial or industrial areas. Average daily traffic volumes should not exceed 2,500 vehicles in residential areas, and 10,000 vehicles in commercial or industrial areas. The design and location of driveways should be regulated in order to ensure safe operating conditions. Posted speed limits on these streets range from 25 to 35 mph. On street parking is commonly found on these streets.

g. **Rural Collectors -** These streets are designed to serve as feeder roads to large areas of existing and proposed low density agricultural and residential development. Average daily traffic volumes should range between 1500 to 2500 vehicles on two travel lanes. The design and the location of driveways should be regulated in order to ensure safe operating conditions. Posted speed limits will usually range between 45 to 50 mph.

h. **Local Streets -** These streets should carry fewer than 1,500 vehicles per day. The purpose of these streets is to provide access to abutting land uses at operating speeds of 30 mph or less in urban areas, and 45 mph or less in rural areas.

2. Functional Classification of the Existing Street and Highway System

The existing streets and highways of the City as well as State roads and private streets within the City are classified as interstate highway, arterial, collector, or local streets, as contained in Table VI-1 and portrayed on Exhibit VI-1.

Table VI-1. Functional Classification of the Existing Street & Highway System

Functional Classification	Total Miles	Street Name	All or partial	From	To
INTERSTATE HWY	17				
		I-93	Partial	Bow TL	Canterbury TL
		I-393	Partial	I-93 Exit 15	Pembroke TL
		I-89	Partial	I-93 Exit 11	Hopkinton TL
ARTERIAL STS					
Major	25				
		Clinton Street	All		
		Loudon Road	All		
		Hoit Road	Partial	I-93 Exit 17	Canterbury TL
		NH Route 3[1]	All	Manchester St	Village Street
		NH Route 106	All		
		Pleasant Street	Partial	Main Street	Langley Parkway
		South Street	Partial	Clinton Street	Pleasant Street
Minor	9	East Side Drive	Partial	Loudon Road	I-393
		East Street	All		
		Langley Parkway	All		
		Pleasant Street / Hopkinton Road	Partial	Langley Parkway	Hopkinton TL
		South Main St/Rt 3A	Partial	West Street	Bow TL
COLLECTOR STS					
Major	20				
		Airport Road	All		
		Auburn Street	All		
		Broadway	All		
		Centre Street	Partial	Liberty Street	North Main St
		D'Amante Drive	All		
		East Side Drive	Partial	I-393	I-93 Exit 16
		Ft. Eddy Road	All		
		Hazen Drive [State]	All		
		Hall Street	All		
		Integra Drive	All		
		Liberty Street	Partial	Centre Street	Warren Street
		Mountain Road	Partial	I-93 Exit 16	Shaker Rd
		Old Turnpike Road	All		
		Regional Drive	All		
		South Street	Partial	Clinton Street	Bow TL
		South Fruit Street	All		
		Warren Street	Partial	Pleasant Street	Liberty Street
Minor	26				
		Abbott Road	Partial	Manor Road	Sewalls Falls Rd
		Bog Road	All		
		Carter Hill Road	All		
		Green Street	All		
		Hoit Road	Partial	I-93 Exit 17	Loudon TL

Functional Classification	Total Miles	Street Name	All or partial	From	To
Minor Collectors		Horse Hill Road	All		
(continued)		Lake View Drive	Partial	Carter Hill Rd	Little Pond Road
		Little Pond Road	All		
		Manor Road	All		
		Mountain Road	Partial	Shaker Road	Canterbury TL
		North State Street	Partial	Pleasant Street	Bouton Street
		Sewalls Falls Road	All		
		Shaker Road	All		
		South State Street	All		
		Warner Road	All		
Urban	20				
		Allison Street	All		
		Borough Road	All		
		College & Institute Drives [State]	All		
		Commercial Street	Partial	I-393	Delta Drive
		Constitution Ave	All		
		Delta Drive	All		
		Downing Street	All		
		Elm Street	Partial	Chandler St	Village Street
		Franklin Street	Partial	Auburn Street	North Main St
		Hutchins Street	All		
		Liberty Street	Partial	Centre Street	Rumford Street
		Locke Road	All		
		Oak Hill Road	Partial	Appleton St	Irving Drive
		Old Loudon Road	All		
		Perley Street	Partial	South State St	South Main St
		Pembroke Road	All		
		Penacook Street	All		
		Portsmouth Street	Partial	East Side Dr	Old Loudon Rd
		Rockingham Street	All		
		Rumford Street	Partial	Liberty Street	North State St
		Shawmut Street	All		
		Storrs Street	All		
		Washington Street	All		
		Washington St, Pen	All		
		W. Washington St	Partial	Liberty Street	Warren Street
		West Street	All		
		Whitney Road	All		
Rural	8				
		Blackwater Road	All		
		Elm Street	Partial	Chandler St	Horse Hill Rd
		Fisk Road	All		
		Long Pond Road	All		
		Oak Hill Road	Partial	Irving Drive	Loudon TL
		Silk Farm Road	All		
LOCAL STS	128				
PRIVATE STS	38				

[1] NH Rt 3 includes Manchester, S. Main, N. Main, Bouton, & N State Streets, Fisherville Road, & Village Street.

Exhibit VI-1. Functional Classification of the Existing Street and Highway System

[Insert: 11 x 17 graphic]

3. Modifications to the Functional Classification System

a. The following streets are proposed to be re-classified as follows if re-constructed in accordance with the recommendations of this Master Plan prior to 2030:

i. **Loudon Road** - Once modified from a four-lane to three-lane section from Airport Road/Hazen Drive to D'Amante Drive, the functional classification of this segment of Loudon Road shall be revised from Major Arterial to Major Collector.

ii. **Route 3 North (North State Street/Fisherville Road/Village Street) -** Once the corridor long conversion to a two- or three-lane section is implemented from Bouton Street north through Penacook Village, the functional classification of this segment of Route 3 North shall be revised from Major Arterial to Major Collector.

iii. **Route 3A (South Main Street) & Hall Street –** If and when approved by NHDOT, Hall Street from Exit 13 southerly to the intersection at Route 3A in the Town of Bow would become part of Route 3A, and South Main Street from Kelley Square southerly to Exit 12 of I-93 would no longer be designated as such. In that event, the functional classification of Hall Street in Concord shall be revised from Major Collector Street to Minor Arterial Street, and the functional classification of South Main Street shall be revised from Minor Arterial Street to Urban Collector Street from West Street to Broadway.

b. The following new streets are proposed to be classified as follows if constructed in accordance with the recommendations of this Master Plan prior to 2030:

i. **Langley Parkway North** - Once upgraded from Pleasant Street northerly on the Concord Hospital campus, and constructed further northerly from Concord Hospital to Rumford Street, with improvements to **Penacook Street** from Rumford to North State Street, Langley Parkway North shall be classified as a Minor Arterial Street. **Rumford Street** between Langley Parkway and North State Street shall be classified as a Minor Arterial Street.

ii. **Storrs Street Extensions, North & South –** When constructed northerly and southerly from the current termini, Storrs Street Extensions shall be classified as Urban Collectors.

iii. **Old Suncook Road Extension –** When constructed southerly from Manchester Street to intersect with Integra Drive and a connector from Route 106, Old Suncook Road Extension shall be classified as a Minor Arterial Street.

iv. **Route 106 Connector** - When constructed between Route 106 and either Hall Street or Interstate 93, shall be classified as a Minor or Major Arterial Street, respectively, depending on the westerly terminus.

v. **Fort Eddy Road Connector** – When constructed between North Main/Storrs Streets and Fort Eddy Road, the new connector shall be classified as a Minor Arterial Street.

D. CONNECTIVITY

Establishing and adopting the functional roadway classification system provides an organized hierarchy to the City's roadway system. However, for the roadway system to be effective, efficient, and to serve to maintain a sense of community, the roadway system needs to exhibit a sense of connectivity. Roadway connectivity refers to a street system that provides multiple routes and connections to the same origins and destinations.

One of the difficulties that the City of Concord, like other municipalities, faces is development projects that come before the Planning Board exhibiting poor connectivity. This can often be seen with residential subdivisions, where the subdivisions are designed as a series of cul-de-sacs. Although the residents who live on these types of streets generally prefer this type of disconnected street system because of the resulting low volume of traffic in front of their own home, the impact to the community as a whole can be detrimental.

A well connected street system provides motorists, pedestrians, and bicyclists better, more direct and shorter travel routes to schools, shopping, and other neighborhoods. A well connected street system not only provides shorter and more efficient connections, but also serves to reduce traffic congestion along the major arterial roadways. The result is a more efficient roadway system with less need to be continually adding capacity to the City's major streets. A well connected street system also improves emergency response times for firefighters, police, and ambulance services. In addition to the traffic operational benefits, a well connected street system also serves to create a sense of community as opposed to a sense of isolation that cul-de-sacs often introduce. This is not to say that cul-de-sacs should be prohibited in the City, but a well planned connected street system should be a key element in the City's transportation master plan.

E. TRAFFIC CALMING

As important as it is that the City's roadway system can accommodate future traffic growth, it is more important that the City is able to manage the flow of traffic. One way to effectively manage the flow of vehicular traffic is through the implementation of traffic calming techniques. The concept of traffic calming stems from the idea that roadways are shared by many users, including pedestrians and bicyclists, and that roadways can be designed to safely accommodate and encourage pedestrian movements rather than simply being designed to process vehicular traffic. Traffic calming involves the implementation of physical modifications to the roadway in an effort to not only reduce vehicle speeds, but to decrease the dominance of vehicular traffic.

The primary effect of traffic calming is to change the look and the feel of a roadway in such a way that motorists will expect pedestrian activity and therefore will drive accordingly.

The following are a sampling of traffic calming actions that can be used to change the character of an area and alter the expectations of motorists.

1. **Gateway Treatments** - These serve to present a positive indication of a change in environment from a roadway that primarily serves vehicular traffic to a more pedestrian friendly environment. These treatments include reducing the pavement width, modifying the pavement texture, and adding landscaping and other streetscape close to the travelway.

The purpose of this treatment is to alert the motorist that he or she is entering a traffic calming area and should expect to encounter pedestrians.

2. **Chokers -** Extensions or curb bulbs, chokers serve to narrow the street thereby reducing the pedestrian crossing distance and, as a gateway treatment, signals a change in the character of the roadway.

3. **Speed Humps** - Different from speed bumps, speed humps can be an effective means of traffic calming by introducing a vertical acceleration factor to the moving vehicle. Speed humps typically measure 3 to 4 inches in height and are approximately 12 feet in length. The characteristics of speed humps differ significantly from speed bumps, which are commonly used in parking lots and measure 3 to 6 inches in height and are generally no more than a foot or two in length. It is current City policy not to install these devices on arterial or collector streets.

4. **Rumble Strips** - Sections of rough pavement, rumble strips cause a slight vibration to a motor vehicle thereby causing the driver to become more alert and as a result slow down. Although these devices have been shown effective at reducing travel speeds, the noise produced by the rumble strip can raise objections from nearby residents, institutions, and hotels. These strips can also be problematic for bicyclists, although this problem can be addressed by leaving a smooth pavement surface along the shoulder or bike lane.

5. **Median Refuge Islands** - Raised median islands are placed in the center of the roadway separating the directional flow of traffic. The median island not only provides the pedestrian a safe refuge area, but it also serves to reduce the overall pavement area thereby changing the look and the feel of the roadway.

6. **Raised Crosswalks** - Effectively speed humps placed at crosswalks, the crosswalk is raised approximately 3 to 4 inches above the roadway surface with a gradual approach and departure similar to a speed hump.

7. **Roundabouts** - circular intersections with specific design and traffic control features including yield control of all entering traffic, channelized approaches, and appropriate geometric curvature to ensure reduced travel speeds.

When considering the implementation of traffic calming actions, it is important to remember that the primary effect of traffic calming is to change the look and the feel of a roadway in such a way that motorists will expect pedestrian activity and therefore will drive accordingly. For this reason, traffic calming techniques are most effective when used to highlight the function of a local street in contrast to a higher functioning roadway.

F. ACCESS MANAGEMENT

There was a time when municipalities could design safe and efficient roadway systems with little or no coordination between public works departments, who were generally responsible for the roadway system, and planning departments, who were responsible for land use and development decisions. However, in recent years the City of Concord, like other municipalities, have come to recognize that there is a much better way. The better way is through the implementation of access management. Access management balances mobility and access, so

as to improve the efficient movement of traffic while enhancing safe and efficient access to and from abutting properties. However, to be effective, access management requires that land use planners and roadway designers work together.
"Access management is the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway."[1] Along a busy commercial corridor such as Loudon Road, a well conceived access management plan can improve the efficient movement of traffic while enhancing the safe and efficient access to and from abutting properties. Some specific benefits of access management include:

- Safer and more efficient access to properties,
- Fewer and less severe automobile crashes,
- Fewer auto/pedestrian conflicts,
- Less congestion,
- Reduced travel delays,
- Reduced fuel consumption,
- Increased and preserved traffic capacity,
- Enhanced corridor aesthetics,
- Enhanced community character, and
- Preserved neighborhood integrity.

Although the benefits of access management are most readily apparent along busy commercial corridors, the City should also consider the implementation of access management strategies along rural roadways as well. Often times residential subdivisions are designed such that only the back parcels have access to the subdivision roadway while the parcels that directly abut the existing City street have individual driveways for each parcel. Given that many of the City's rural roadways are winding and rolling and as a result have sight distance limitations, it would be beneficial to limit access to the primary subdivision roadway when ever possible.

G. IMPROVEMENTS TO THE CITY'S ROADWAY SYSTEM

1. Overview

The results of the future 2030 traffic volume projections, which were developed by the Central New Hampshire Regional Planning Commission (CNHRPC,) show that the future traffic volume demand within the City of Concord will substantially exceed the capacity of the City's roadway system. To often the first reaction to an expected lack of roadway capacity is to increase the carrying capacity of the roadway system. This is not necessarily the best approach. To minimize the need to continue to add travel lanes and/or to widen existing roadways or construct new roadways will require the City to aggressively pursue the multi-modal approach that has been built into this Transportation Section of the Master Plan. This includes enhancing pedestrian and bicycle mobility through the implementation of the sidewalk and bicycle plans, encouraging transit ridership, and pursuing future opportunities with rail and air transportation.

Nevertheless, despite the most aggressive pursuit of alternative modes of transportation, the anticipated future growth will require that the carrying capacity of the City's roadway system be increased. However, this is not to say that the solution is to simply add capacity to those roadways where the greatest demand is expected. It will be necessary to add capacity to the

[1] Access Management Manual; Transportation Research Board, Washington, D.C. 2003

City's roadway system; however, it will be just as important to limit the amount of vehicular capacity in certain areas of the City - such as near residential areas. The Master Plan provides an opportunity to plan for the future - rather than simply react to it.

The key to accommodating the future growth on the City's roadway system, while protecting the quality of life within the community, will be to identify key connections (some existing roadways and some new roadways) that would be designed to efficiently move vehicular traffic through or around the City while at the same time identifying roadways that would be designed to discourage through traffic.

Enhancing the efficient movement of vehicular traffic will come from adding travel lanes, providing needed turn lanes, implementing good access management techniques, requiring improved roadway connectivity, and by putting in place and maintaining coordinated traffic signal systems. Conversely, vehicular traffic will be discouraged along some roadways where a more context sensitive design approach would serve to encourage pedestrian movement and enhancing community character. The design for these types of roadways should focus on various traffic calming actions.

The following provides a brief discussion on which roadways should be designed to efficiently move vehicular traffic and which roadways should be designed to discourage through traffic.

2. Interstate 93

As a major interstate highway, I-93 has a primary function of processing high volumes of regional and interstate traffic. The highway falls under the jurisdiction of the New Hampshire Department of Transportation (NHDOT) and in fact the NHDOT is currently conducting a study of this segment of I-93 to determine its long-term plan. However, because the interstate highway bisects the City, the operation of the highway as well as its interchanges can dramatically affect the operation of the City's transportation system.

It is clear that I-93 will need to be widened from its current 4-lane operation. The question is, will the highway need to be widened to a 6-lane or an 8-lane configuration. There are many valid reasons (aesthetic, cultural, historical, and environmental, etc.) why the City may prefer that 6 lanes be the maximum configuration of the highway. However, from a traffic perspective, the way to minimize the impact of traffic growth on the City's street system is to ensure that I-93, including its interchanges, has all the capacity that is needed to accommodate future growth.

The CNHRPC's traffic model shows 2030 peak hour directional volumes (one direction only) along I-93 ranging from approximately 5,500 vehicles per hour (vph) between Exits 13 and 14 to 7,600 vph between I-89 and Exit 12. To maintain acceptable operations along I-93, this level of traffic growth would necessitate four lanes per direction or an 8-lane highway. Otherwise, as traffic growth and congestion occurs the future traffic demand will be forced from the arterial streets to collector streets to eventually local streets.

There may, however, be a way of accommodating the regional growth without expanding I-93 to an 8-lane section. That option would be to construct a new connector roadway or by-pass of Route 106 that would extend from I-93 at I-89 to I-393 east of Route 106. One of the primary reasons why the segment of I-93, within the City of Concord, is congested is the inefficient layout of the regional highway system where I-393 intersects I-93 to the north of the City's downtown and I-89 intersects I-93 to the south of the City's downtown. This inefficient layout of the regional highway system results in unnecessary travel demand along the segment of I-93

between I-89 and I-393. Connecting I-89 to I-393 at I-93 south of the City may allow a reduced cross section of I-93 of no more than 6 lanes.

3. Opportunity Corridor

The Opportunity Corridor extends north-south from approximately Exit 12 to Exit 15 on I-93 and encompasses approximately 500 acres of land between the Merrimack River and the downtown. As described in the Concord Opportunity Corridor Master Plan[2] vision statement "*The Opportunity Corridor should become a magnet for new job opportunities, bring new residents into the City, hosting commercial and cultural activities, preserving large areas of green space, and providing for efficient transportation. The corridor will be walkable, livable, and characterized by human scale. An attractive mix of offices and shops, restaurants, cafes, residences, cultural amenities, parking, waterfront access and parks will create a unique destination for residents and visitors. Passenger rail service will connect to Boston and Montreal. Sidewalks and bike paths radiating from a central Common will connect to the surrounding downtown areas and neighborhoods, and trails along the river will lead to natural treasures beyond city limits.*"

The Plan's transportation-related recommendations include:

a. Modify 1-93 Exit 14 and 15 interchanges to improve roadway and district connectivity, and eliminate weaving hazards posed by the proximity of the two interchange ramps.

b. Create alternative routes along the Opportunity Corridor to facilitate north-south circulation at the local level.

c. Improve east-west accessibility between the downtown, the Opportunity Corridor, and the neighborhoods to the east of the river.

d. Provide roadway alternatives that will alleviate traffic congestion on Loudon Road, North Main Street and Fort Eddy Road.

e. Preserve and enhance a passenger rail right-of-way into and through Concord.

f. Secure a preferred location for a future multimodal transportation center near the downtown.

g. Improve integration of pedestrians, bicycle, transit and local vehicular circulation.

Specific elements of the recommended plan include:

- Construction of a new Exit 15 interchange to improve the transition from the highway to the local streets while easing highway-to-highway connections.

- Construction of a new collector-distributor roadways parallel to I-93 between Exits 14 and 15 to allow for the closure of the northbound on-ramp and the southbound off-ramp at Exit 14 and the elimination of traffic weaving hazards on I-93.

[2] Concord Opportunity Corridor Master Plan; April 2005 by The Cecil Group Inc., Bluestone Planning Group, Rizzo Associates, Inc, Bonz and Company, Inc.

- Extension of Storrs Street to provide a north-south spine and double-loaded development boulevard along the corridor connecting the Horseshoe Pond area to the North and Central Opportunity Corridor districts.

- Creation of a new Fort Eddy Road east-west connector to provide an alternative to Loudon Road and to reduce traffic congestion on Loudon Road, North Main Street and Fort Eddy Road.

- Reduction of traffic signals on Loudon Road at Exit 14 to three with improved spacing between signals.

- Establishment of a rail corridor alignment that will accommodate freight and passenger rail service, minimizing at grade crossings, and maintaining adequate clearances and track curvature.

- Location of the multimodal transportation center in the Central Opportunity Corridor providing access to local and regional buses, public parking, and downtown passenger rail service.

- Relocation of the rail yard out of the Central Opportunity Corridor.

- Accommodation of bicycles and pedestrians along existing and new transportation infrastructure networks.

- Re-locate the existing I-93 and railroad alignments approximately 100 feet to the west between Exits 13 and 14, and depress the highway in this area in order to allow for the creation of a public waterfront and to facilitate the "river connection" - a visual and pedestrian connection between Downtown Concord and the Merrimack River.

4. Corridors Designed to Efficiently Process Vehicular Traffic

To enhance the efficient movement of vehicular traffic throughout the City, additional roadway capacity (adding lanes) should be provided along the following roadways.

a. **Langley Parkway** - From a more local perspective, the most important and needed upgrade of the City's roadway system is the construction of the north end of the Langley Parkway. Providing motorists the ability to travel to the City's growing medical area at the western end of Pleasant Street by way of this new 2-lane roadway would substantially reduce the traffic volumes and congestion along roadways such as Centre Street and Pleasant Street as well as numerous neighborhood streets and streets in the downtown area.

b. **Clinton Street** - With the completion of the north end of the Langley Parkway, the segment of Clinton Street from the Langley Parkway to I-89 will need to be widened to a 4-lane cross section. Providing additional capacity along this key roadway segment will provide motorists convenient access to and from the regional highway system (I-89) once again reducing the potential for unnecessary travel along the City's collector and local streets. For example, a motorist that is destined to the south on I-93 from the Concord Hospital area will choose the Langley Parkway to Clinton Street to I-89 route if there is sufficient capacity and no congestion. Otherwise motorists may continue to travel east along Clinton Street to Broadway to Exit 12 at I-93.

c. **Pleasant Street** - Similarly with the completion of the Langley Parkway, the segment of Pleasant Street from the Langley Parkway easterly to South Fruit Street/Warren Street intersection could be maintained with a single lane in each direction with perhaps a third center-turn lane provided to accommodate access to side streets and driveways. Without the Langley Parkway this segment of Pleasant Street would need to be upgraded to a four-lane section (two through lanes in each direction) with a fifth turning lane provided at major driveways. The Pleasant Street/South Fruit Street/Warren Street intersection will need to be reconfigured and upgraded regardless.

d. **Route 4 west of I-93 Exit 17** - Another key link to the regional system, which can be found at the northernmost extent of the City, is Route 4 from the west at the I-93 Exit 17 interchange. To protect the Fisherville Road/North State Street corridor from continued traffic growth will necessitate easy access/egress to/from the regional highway system at Exit 17. This would necessitate the widening of Route 4 west of Exit 17 to a 4-lane section, the upgrade of the intersections at the Exit 17 northbound and southbound ramps, and the completion of Whitney Road to provide connectivity between Sewalls Falls Road and Route 4.

e. **Route 106** - Additional roadway capacity will also be needed along Route 106. Again, Route 106 has an important connection to the regional highway system. Providing convenient access/egress to/from I-393 as well as I-93 with the recent upgrade of the Regional Drive/Old Turnpike Road corridor serves to reduce the traffic congestion along Loudon Road. Route 106 should provide 4-lanes (2 lanes per direction) with additional turn lanes at major intersections throughout its length.

f. **Manchester Street** - Finally, Manchester Street should also be widened to improve the carrying capacity of the roadway and the City's transportation system. Manchester Street should be widened to a 5-lane cross section consisting of two through lanes in each direction plus a center turn lane.

5. Corridors Designed to Discourage Through Vehicular Traffic

It is not necessary or even prudent to continue to add travel lanes to all of the City's major corridors. Some corridors can be designed to operate efficiently while maintaining or in some cases reducing the number of travel lanes. The following roadways can and should be improved to operate more efficiently without increasing the number of travel lanes.

a. **Loudon Road** - The best example of enhancing the efficient movement of traffic without increasing the number of travel lanes is the proposed conversion of Loudon Road from 4 lanes to 3 lanes. Currently, Loudon Road operates poorly with substantial congestion despite a 4-lane cross section. The poor operation is primarily due to the unbalanced lane distribution that results from motorists coming to a stop in the two inside travel lanes as they wait to turn left onto one of the numerous driveways along the roadway. The conversion to a 3-lane section will provide a safer and more efficient operation while accommodating the same volume of traffic.

b. **I-393 Exit 2** - Another important action that would enhance the efficient movement of traffic without providing additional travel lanes would be to realign the northern end of Hazen Drive so that it intersects directly opposite the I-393 Exit 2 eastbound ramp. This action would

improve traffic operations at the Hazen Drive/East Side Drive intersection and would serve to encourage the use of Hazen Drive and I-393 as an alternative to Loudon Road.

c. **Fisherville Road** - The City has just completed a corridor study of Fisherville Road. Based on input from the public, recommendations suggest that the corridor will be limited to a maximum 3-lane cross section consisting of a single lane in each direction and a center turn lane. The plan calls for upgrading the corridor with a bike lane and sidewalks in an effort to enhance pedestrian and bicycle movement while limiting the number of through lanes in an effort to discourage through traffic.

d. **North State Street** - From Washington Street to Bouton Street, North State Street will be upgraded without increasing the throughput capacity of the corridor. The planned actions call for the reconstruction of the Bouton Street intersection so as to eliminate the free flow high-speed southbound movement onto North State Street and require motorists to make a 90-degree right-turn at the traffic signal. Other actions include the construction of a mini-roundabout at the Franklin Street intersection, tightening turning radii and reducing pavement width at the Washington Street intersection, and the placement of well delineated crosswalks with bump-outs. The objective of the plan is to process traffic efficiently, but to do it in such a way as to reduce travel speeds and more importantly to reduce the dominance of the motor vehicle.

6. Other Actions for Consideration

In addition to the roadways that will either be designed to increase there carrying capacity or designed to discourage through traffic, there are other actions that should be considered to enhance the City's overall traffic circulation and connectivity.

a. **Storrs Street** - Traffic operations in the downtown area would be improved with both the northern end and southern end extensions of Storrs Street. Extending Storrs Street to Commercial Street to the north and to South Main Street to the south will serve to reduce travel demand along Main Street, which will allow the City to implement more pedestrian friendly features along Main Street.

b. **Route 3A** - The City should consider petitioning the State to designate Hall Street as Route 3A as opposed to South Main Street. Doing so would allow the City to better protect the neighborhoods in the south end from the continued influx of traffic. Traffic calming north of Exit 12, or limiting access to Exit 12 from the north should be considered**.**

c. **I-89** - The City should also begin to consider how a reconfigured and upgraded Exit 1 interchange at I-89 may alter traffic flow in the south end of Concord. Although there are no definitive plans at this time, the interchange will be reconfigured at some time in the future. The City should be prepared to take a position as to whether direct access to the interstate from South Street is in the City's best interests.

H. PEDESTRIAN MOBILITY AND SIDEWALK IMPROVEMENTS

Sidewalk improvements are those identified as either short term or long term improvements on Exhibit VI-2, Sidewalk Plan. Sidewalks are required in all new subdivision streets within the Urban Growth Boundary (UGB) and are required along the frontages of new commercial and

non-residential development. If conditions warrant, the City Planning Board may require additional off-site sidewalk improvements to link, or close gaps in the sidewalk system serving a new development.

The highest priority will to complete continuous sidewalks on all arterial and collector roads on one side of each such street within the UGB, and to complete sidewalks on walk-to-school routes. The next level of priority is to complete continuous sidewalks along both sides of arterials and collector roads within the UGB, to complete linkages between neighborhoods, and between neighborhoods and commercial and institutional areas. The third level of priority is to complete sidewalks on both sides of streets in the highest density residential neighborhoods where right-of-way allows, and on one side of the streets in medium density neighborhoods, excluding dead end streets and alleys less than 500' in length. The lowest priority will to provide sidewalks along arterial and collector roads in low density residential districts inside the UGB.

Sidewalks are not intended to be constructed outside the UGB; however, where there are nodes of rural residential development, gravel shoulders should be provided adjacent to the traveled way to facilitate pedestrian movement that is safer than walking along the edge of the traveled way. The rural areas of the City will be linked by trail systems (see Section VII, Conservation and Open Space). These trails should be connected along the edge of the UGB to the sidewalks located within the UGB, so as to create pedestrian connectivity from neighborhoods to the City's open spaces.

I. BICYCLE MOBILITY AND IMPROVEMENTS

Bicycle routes are designated on Exhibit VI-3, Bicycle Plan. The first priority for bicycle mobility is to appropriately mark and sign the designated bicycle routes and the second highest priority is to insure that provisions are made for bicycles to share the road with motor vehicles by the marking out or adding shoulders along arterial and collector roads. The identified highest priority corridor is Route 3 north including North State Street, Fisherville Road, and Village Street in Penacook.

Bicycle routes are designated as either primary routes or secondary routes. Primary routes are those identified in either the State or Regional Bicycle plans plus those local additions to said routes that will better serve the Concord community. Most designated routes utilize existing streets and roads. Existing and proposed off-road paths are also shown on the plan for both primary and secondary routes. Off-road bike paths are intended for recreational use as well as commuting, and may be joint use paths for both pedestrian and bicycle traffic. Some paths may remain unpaved due to environmental and conservation restrictions.

Bike routes along existing arterial and collector roads, either designated as primary or secondary routes, should all have appropriate signage and be provided with joint use shoulder/bike lanes wherever pavement and right-of-way of way is available. Narrowing the width of travel lanes should be considered in order to provide for wider shoulders for bicycle use. Joint use bicycle lane/shoulders should be incorporated into all roadway resurfacing and reconstruction projects. Four-foot (4') minimum width shoulders/bicycle lanes should be provided on both sides of arterial and collector on all major highway improvement projects.

Routes on low volume streets within the Urban Growth Boundary, with posted speeds of 30 mph or less, may be signed with the bicycles sharing the travel lanes. Outside of the Urban Growth

Exhibit IV-2. Sidewalk Plan

[Insert: 11 x 17 graphic]

Exhibit IV-3. Bicycle Plan

[Insert: 11 x 17 graphic]

Boundary, gravel shoulders may be provided along rural collector roads and bicycles would share the traveled way of local rural roads.

J. ALTERNATIVE TRANSPORTATION MODES

Alternative Transportation modes in Concord involve air transportation, freight rail service, as well as inter-city and intra-city bus service. The City of Concord is responsible for air transportation as the owner of Concord Airport, while rail freight service and bus service is provided by private and non-profit service providers. The possibility of adding passenger rail service in the long term (20 years plus) has been enhanced by the designation of a federal high speed rail corridor from Boston to Montreal through Concord.

1. Air Transportation

a. Description of Concord Airport

The 614 acre Concord Municipal Airport is located on Concord Heights and is primarily accessed from Airport Road with secondary access from Regional Drive. The Airport was established in 1920 and functions as a general aviation airport and as a base for the NH Army National Guard 1159th Medical Company Air Ambulance on a 26 acre leased parcel. The Airport also serves as a base for the NH State Police Aviation Unit, the NH Civil Air Patrol, and a number of private airport related businesses. The Airport does not receive scheduled commercial air service which is primarily being provided from the Manchester Airport, 20 miles to the south, and Logan International Airport in Boston, approximately 70 miles south-southeast.

The City of Concord owns and operates the airport. A private contractor is retained as a Fixed Base Operator (FBO) and is responsible for daily airport operations, interior building maintenance, servicing aircraft and also serves as the onsite airport manager for the City.

Two active runways serve the Airport, Runway 17-35 and Runway 12-30. Runway 03-21 has been closed since the 1990's. Runway 17-35 is 6,005 feet in length (100 ft wide) and is the main runway with approximately 75% of aircraft operations utilizing this runway. Runway 12-30 is 3,200 feet long (75 ft wide) and is used for approximately 25% of the total take off and landings at the Airport. The Airport is a non-towered airport with a B-II designation, with design criteria for airplanes with landing speeds up to 121 knots and wingspans up to 79 feet. Larger aircraft can and do routinely use the Airport but the FAA rules and regulations that govern the Airport are associated with the B-II category of aircraft.

The Airport is anticipated to remain a general aviation airport for the foreseeable future. Total Annual Operations were 62,300 in 2004 and are forecast to grow to 85,400 by 2023. In 2004, a total of 92 aircraft were based at the Airport (including military). Of this total, 71% were small private single engine aircraft. The amount of locally based aircraft is expected to grow by 48% with a corresponding demand for hanger space and aircraft tie downs. The peak uses at the Airport are associated with NASCAR race weekends at the Loudon International Speedway and events at St. Paul's School in Concord.

The Airport is subject to a Conservation Management Agreement between the City of Concord, Federal Aviation Administration (FAA), NHDOT, the US Fish & Wildlife Service, and the NH Fish and Game Department for the preservation and enhancement of habitat for the Karner Blue

Butterfly. In addition, the pitch pine woodland and scrub oak communities on the Airport are the home to three (3) other state endangered or threatened butterflies or moths and two (2) threatened plant species, Wild Lupine and Golden heather. The Airport is divided into a number of development parcels (DZ) and conservation zones (CZ). Development is prohibited in the CZ parcels and the parcels are managed by the US Fish & Wildlife Agency for the preservation and enhancement of habitat for the Karner Blue Butterfly and other threatened plant and insect species.

b. Concord Municipal Airport Master Plan

The City of Concord is required by the Federal Aviation Administration (FAA) to update its Airport Master Plan approximately every 10 years. The latest update was completed in May of 2006 and was adopted by the Planning Board on May 3, 2006. The Airport Master plan is intended to guide investment at the Airport for a twenty (20) year planning period and contains an inventory of existing conditions, an analysis of the existing facilities, forecasts of future growth and activity at the Airport, as well as recommendations in regard to capital improvements, use of the Airport property, and Airport operations, management and financing.

Federally eligible projects may receive 95% of the necessary funding from the FAA, with a match of 2.5% from NHDOT – Division of Aeronautics, and 2.5% match from the City of Concord. This funding ratio may change in 2007 when the federal Airport Improvement Plan (AIP) is up for reauthorization.

It is noted that only ten (10) acres of undeveloped property at the Airport property now remain for development purposes. Over the last forty (40) years a significant amount of property has been removed from the Airport holdings for economic development purposes including all the land abutting Barrell Court, Henniker Street, the west end of Chenell Drive, as well as most of land the along the east end of Regional Drive and the east end of Chenell Drive. Twenty six (26) acres of Airport property has been leased and developed by the NH Army National Guard for their aviation facility located southerly of Regional Drive. This Master Plan recommends the remaining ten (10) acres be reserved exclusively for aviation related uses.

The major projects planned at the Airport include the following improvements:

i. Acquisition of abutting private property north of runway 17-35 along Grant, Greeley and Robinson Streets where the existing homes will be demolished and the existing trees cut within the Runway Protection Zone (RPZ).

ii. Acquisition of property to the south and southwest of runway 17-35 in both Concord and Pembroke to allow the removal of obstacles (primarily trees) encroaching into the “obstacle free zones”.

iii. Replacement of the existing Airport terminal at its current location along with expanded paved parking and additional overflow turf parking north of Regional Drive.

iv. Extension of runway 17-35 southerly an additional 1000’ to allow for larger aircraft to utilize the airport and better serve the existing and proposed growth in aviation traffic. This extension will require a federal environmental assessment and will likely require additional property takings.

v. Construction of additional hangers for based aircraft adjacent to closed runway 03-21 (new taxiway) and adjacent to Regional Drive.

vi. Construction of a parallel taxiway adjacent to runway 12-30 as well as the reconstruction of the closed runway 03-21 as a taxiway.

vii. implementation of a number of minor projects intended to improve safety and operations inside the existing airport perimeter including but not limited to a complete perimeter fence, turf perimeter road, aviation lighting, landing aids, improvements to runway shoulders, blast pads and itinerant airplane parking areas.

2. Bus Service

a. Intra-City Bus Services

The Concord Area Transit (CAT) system has operated under the purview of the Concord Community Action Program since its inception in 1989. The fixed route service provides service for commuters, shoppers, and the general public from Penacook to Downtown Concord, from Concord Hospital to the Steeplegate Mall and Walmart, and from St. Paul's School to the New Hampshire Technical Institute and Ft. Eddy Road including the Stickney Avenue inter-city bus station. The CAT system currently has three scheduled routes: Heights, Penacook and Crosstown. Service is provided on weekdays from 6:30 AM to 6:30 PM. Service is provided hourly with transfers occurring downtown in front of the Statehouse on North Main Street. Ridership of the fixed route system has grown from 89,284 in 2000 to 103,397 in 2005.

The CAT system is financed primarily by Federal Mass Transit funds, with assistance from the City of Concord, and private donations including funding from its parent organization the Concord Community Action Program. Fair box revenues cover between ten to twelve percent (10-12%) of the system operating costs.

CAT operates a Senior Transit System which provides transportation for seniors (aged 60 and over), serving 12 towns throughout Merrimack County. On a space available basis, those persons under age 60 are welcome. CAT also operates a Special Transit Service serving persons with disabilities who are unable to use the fixed route service. This service is door to door with reservations required.

Concord Area Transit (CAT) has developed the first recognized dispatch system in New Hampshire to provide coordinated, door to door service utilizing the shared resources of transportation providers in the Concord area. This demand response service uses the scheduling and dispatching resources of Concord Area Transit to expand the availability of door to door services to the greater Concord area. CAT is presently coordinating dispatch and scheduling for several agencies and intends to expand the number of providers and vehicles in the future to include all transportation providers in the region. Service is provided Monday through Friday between 6:30AM and 5:30 PM on a space available basis. Trips may be requested up to 5 days in advance, but at least 24 hours advance notice is required. All requests are scheduled on a first come first served basis. This is a shared ride service and the cost of service varies based on trip length. Qualifying individuals may have all or a portion of the travel expense subsidized by funding sources.

The CAT system also provides a shuttle service from remote lots for jurors at the US District Court and stands ready to assist other institutions in the City with similar transit needs.

Plans are in place to expand the number of fixed routes in the coming years including service to the surrounding communities of Pembroke, Bow and Boscawen and to expand the hours of operations when operating funding is secured. The 2003 Concord Area Transportation Plan envisions several new routes, the addition of new buses on existing routes to expand service, and the extension of the hours of operation to better serve the population not served by the automobile, as well as commuters, visitors and residents looking for alternative transportation.

The City has endorsed these endeavors, and supports the expansion of the CAT system financial base to include other communities in the Central New Hampshire Region, as well as large scale institutions in the City, expanded federal support, and assistance from the State of New Hampshire.

As population grows and ages, the demand for non-fixed route door-to-door service is expected to grow, hours of operation are anticipated to increase, new routes will need to be added, and the number of buses serving each route will reduce the once per hour head (arrival) times of the current system. More bus shelters will be needed to enhance the convenience of system users, and all bus shelters will require continuing maintenance.

b. Inter-City Bus Service

Bus service is provided by Concord Trailways from the Stickney Avenue Station in Concord to Manchester, and on to South Station and Logan Airport in Boston. Vermont Transit Lines provides limited bus service from Concord north to White River Junction, Vermont and southerly to South Station in Boston. Peter Pan Bus Lines also provides limited service to points south of Concord. Inter-city bus services are anticipated to grow over time. Currently, shuttle service to Manchester Airport is limited due to the availability of parking at the Stickney Avenue facility.

c. Stickney Avenue Bus Station

The Concord Bus Terminal was constructed in 1996 with 273 parking spaces. Since its inception this facility has been well received and well utilized. In 2005, an additional 50 parking spaces were added to this facility, and an additional 130 parking spaces will be made available at upon closure of the Department of Transportation facility across the street from the terminal. A Congestion Mitigation and Air Quality CMAQ application has been submitted by the State of New Hampshire to purchase the old Concord rail yard and construct an additional 200 parking spaces to provide parking for a bus service from Concord to Manchester Airport.

d. Multi-modal station

The City envisions the construction of a multi-modal transportation facility in Downtown Concord. This multi-modal facility will be designed and located to serve intra-city and inter-city bus service, commuter rail service to south to Boston, and high speed rail service on the Boston to Montreal Corridor. The facility should provided structured parking for at least 1000 cars and expansion capability for 2,000 or more vehicles.

3. Railroads – Freight and Passenger Service

a. Existing Rail Services and Rail Corridors

Rail transportation has historically played an important role in the City of Concord's transportation system. Freight railroads have transported goods to and from Concord businesses for years and continue to do so today, albeit in smaller quantities. Historically, Concord was the hub of the northern New England passenger rail network, at the junction of lines heading to the Lakes Region, northern New Hampshire, Vermont, Boston, and Montreal. Rail continues to play an important role in Concord's freight transportation system, and has the potential to play a larger role in freight and passenger transportation in the future.

The New Hampshire Main Line (NHML) extends from downtown Concord southward to Boston. The New Hampshire section of the NHML is 39 miles long, running between Concord and the Massachusetts state line, passing through Bow, Hooksett, Manchester, Merrimack, and Nashua. It is owned by the Boston & Maine Corporation and operated by the Springfield Terminal Railway Company and the New England Southern Railroad. Local freight service between Manchester and Concord is provided by the New England Southern Railroad.

There is no passenger service within the City of Concord, and there are four overhead bridges, no undergrade bridges, and no public grade crossings along the two miles of the NHML in Concord. This segment of track is maintained to Federal Railroad Administration (FRA) Class 1 standards, which permits a maximum operating speed of 10 mph for freight trains and 15 mph for passenger trains. The condition of the track surface, ballast, and ties on the NHML in Concord appears to be fair.

The Concord-Lincoln Line extends from central Concord northward to Lincoln, a distance of 73 miles. Two tourist services and one freight railroad operate over this line, which is owned by the State of New Hampshire. Freight service is operated along the line by the New England Southern Railroad; currently there is one freight customer along the line. Sections of the line including bridges and track were rehabilitated in 1996 using both state and private funds. According to the New Hampshire State Rail Plan 2001, the condition of the track surface on the entire Concord-Lincoln Line was "Poor to Good," the condition of the drainage, ballast, and ties was "Fair to Good," and the condition of the undergrade bridges was "Good." There are five overhead bridges, three undergrade bridges and three public grade crossings along the six miles of the Concord-Lincoln Line in Concord. This segment of track is maintained to Federal Railroad Administration (FRA) Class 1 standards, with some sections meeting FRA Class 2 standards (which permits a maximum operating speed of 25 mph for freight trains and 30 mph for passenger trains.)

The Northern Line extends from central Concord northwestward to West Lebanon, a distance of approximately 60 miles. A majority of the Northern Line is owned by the State of New Hampshire. The section from Boscawen to Lebanon is abandoned, and was purchased from the Boston and Maine Corporation in 1995. Two short segments of the line are in operation: a three-mile segment in West Lebanon and a six-mile segment in Concord.

The six-mile section of the Northern Line in Concord runs from Penacook to the junction with the NHML and the Concord-Lincoln Line. This segment is owned by the Boston & Maine Corporation and operated by the New England Southern Railroad. New England Southern currently has no freight customers on the line, but it is still considered active because it has not been abandoned. There are two overhead bridges, two undergrade bridges and four public grade crossings located along the six miles of the Northern Line in Concord. This segment of track is maintained to Federal Railroad Administration (FRA) Class 1 standards. The condition of the track surface, ballast, and ties on the Northern Line in Concord is poor, with many locations overgrown with vegetation.

b. Passenger Rail Opportunities

The existing rail infrastructure in the City of Concord and surrounding areas offers an opportunity to expand the use of the rail system for passenger transportation. Several planning studies and efforts with the potential to bring passenger rail service to Concord are currently underway or anticipated.

The NHDOT is proposing to design and construct a 12-mile extension of an existing commuter rail service from Lowell, MA to Nashua. The proposed project would extend existing commuter rail service provided by the Massachusetts Bay Transportation Authority (MBTA) and would provide an alternative to a highly congested highway corridor. While the current planning efforts focus on extension of commuter rail service to Nashua, the possibility of extending service further north to Manchester and Concord has also been considered. For commuter rail service to be extended to Concord, significant infrastructure improvements including track rehabilitation, construction of a station, construction of a layover/servicing facility, and potential double-tracking would be necessary.

In late 2000, the Federal Railroad Administration (FRA) designated the Boston to Montreal rail route as one of the nation's High-Speed Rail Corridors. High-Speed Rail refers to trains which are capable of maintained speeds in excess of 125 miles per hour; however, due to corridor constraints trains in the Boston to Montreal corridor may only average 80 miles per hour. The designation was in response to a joint application by the states of Vermont, New Hampshire, and Massachusetts that identified the desire to study the feasibility of a rail transportation alternative between the major metropolitan cities of Boston and Montreal as well as intermediate points. Designation of High-Speed Rail (HSR) corridors has been established by the FRA to facilitate planning for alternative travel modes in specific regions. In the application letter to the FRA, the potential use of HSR to reduce congestion on major highway and air corridors within the Boston to Montreal High-Speed Rail (BMHSR) route was cited as a principal reason to evaluate the feasibility of HSR service.

The Boston to Montreal High-Speed Rail Feasibility Study has been divided into two phases to address all the criteria needed to fully evaluate the feasibility of the corridor. Phase I of the study was completed in November 2002. It concluded that further study of operational, engineering, and cost/revenue factors in Phase II is warranted, based on an initial assessment of existing operations, infrastructure, and institutional issues and given the potential ridership of the BMHSR service. Phase I of the study identified Concord as a potential station location on the BMHSR corridor, which would use the NHML from Boston to Concord and the Northern Line from Concord to the Vermont state line. In June 2004, the State Supreme Court ruled that gas tax receipts cannot be used to fund non-highway projects. As a result, Phase II of the study is currently on hold while the state explores alternative funding options.

c. Freight Rail System Issues

New Hampshire's freight rail system faces a number of challenges as it continues to compete with highway transportation in the New England market. A review of the state's rail system conducted as part of the New Hampshire State Rail Plan effort in 2001 identified two significant issues specific the state's freight rail system that must be addressed: accommodating increases in carload weights and providing clearance for double stack trains. In Concord, the provision of adequate yard space and passing tracks for freight operations are important considerations.

The railroad industry is changing to a standard of using 286,000-lb (286K) capacity rail cars to carry commodities on the lines throughout the country. This is an increase of 23,000 pounds from the previous industry standard. None of the three rail lines that serve the City of Concord are capable of handling the heavier cars. The State Rail Plan indicates that the NHML would benefit from an upgrade and might eventually require it. It is unlikely that the Concord-Lincoln Line or Northern Line will require an upgrade to accommodate the heavier cars given present levels of freight usage.

Double stacking improves the efficiency of the railroad and thus makes it more competitive with highway transportation. NH law provides that the standard vertical clearance to be provided along railroads is 22'6", which provides enough clearance for a double stack container, with some room to spare. The New Hampshire State Rail Plan 2001 identified the NHML as a "Moderate" priority for double stack improvements.

In order for freight railroads to operate efficiently, they must have access to yard space in which to switch and store railcars, as well as to strategically placed passing tracks in which one train can pass another.

In Concord, the Boston & Maine Railroad currently has a small freight yard on the NHML, south of the junction with the Concord-Lincoln and Northern lines and north of Water Street. This is currently the primary area for trains to pass each other and for freight cars to be switched and stored in Concord. To ensure the viability of freight rail in the Concord, it will be important for the City to preserve freight yard space, which may include providing a freight yard in a new location if the current yard area near Water Street is developed for other purposes. Because space for a freight yard may be limited, consideration should be given to providing a public access area for transfer of cargo, a sort of public railhead, for transshipment of goods to local businesses which do not have direct access to a siding.

d. Summary of Rail Needs

It is also important for the City of Concord to consider current and future rail requirements when planning any roadway improvements, bridge or grade crossing projects, or considering land use and development plans. Based on the planning efforts that are underway or anticipated, the freight issues identified in the New Hampshire State Rail Plan 2001, and discussions with the NHDOT Bureau of Railroads and Public Transportation, the following rail-related considerations have been identified for the City of Concord:

i. The preservation of existing rail corridors in the city.

ii. The preservation of existing freight yard space, which may include providing a freight yard in a new location if the current yard area south of Water Street is redeveloped.

iii. The reservation of space for passing tracks, particularly on the New Hampshire Main Line (NHML).

iv. The identification and reservation of space for an multi-modal transportation center/rail station; this facility should have the capability of accommodating high-speed rail, commuter rail, intercity bus, local bus, taxis, auto pick-up/drop-off, off-street parking structures, pedestrians and cyclists.

v. Consideration of heavy rail car weights (up to 286,000 pounds) and double-stack clearance when planning transportation improvements within the City.

K. TRANSPORTATION POLICIES AND RECOMMENDATIONS

1. Transportation Policies

Policies related to Transportation Planning

a. Maintain a continuous transportation planning program consisting of the collection, maintenance, and dissemination of traffic information; staff and/or consulting resources to collect, analyze, and report on traffic problems and issues; and continued coordination of transportation planning with other planning disciplines, most notably land use and environmental planning.

b. Consult with the NH Department of Transportation on proposed development projects which may impact the State's primary, secondary and interstate systems, and to seek to cooperation of, and consultation with, the NH Department of Transportation when proposed State developments which it has under review could impact streets and highways in Concord.

c. Maintain a functional roadway classification system of highways, and arterial, collector and local streets.

d. Continue to evaluate and adjust the operations of the highway network to ensure its efficient use and safe function.

e. Endeavor to maintain for all the City's arterial and collector streets a Level of Service (LOS) 'C' for daily conditions, and LOS 'D' for peak hour conditions, recognizing that lower levels of service during the peak hours may occur at certain locations in downtown Concord.

f. Continue to consider within the City's land use regulations such factors as the number, design and location of access points; the provision of median islands to control access; the provision of left and right turning lanes; signalization of access drives; internal circulation patterns; and the provision of pedestrian ways and bikeways.

g. Endeavor to preserve and/or acquire rights-of-way for new or expanded streets in advance of need through purchase, official mapping, and developer dedications.

h. Promote the use of the geometric design of streets to control and direct the movement of vehicles and pedestrians rather than relying on traffic regulatory signs and markings to prohibit unsafe or disruptive traffic movements.

i. Continue to evaluate and designate emergency response routes and to maintain the ability of emergency response providers to utilize these routes.

j. Continue to require that all new and redeveloped property shall provide adequate off-street parking to meet the average and peak parking demand.

k. Continue to encourage developments with complementary parking demands to locate on adjoining sites and to provide opportunities for shared parking.

l. Plan for proper drainage and storm water treatment related to roadway construction and street improvements, public and private parking lots, and paved vehicle storage areas.

Policies relates to the Fiscal Capacity to Support Transportation Infrastructure

m. Promote the safety of all motorists, pedestrians, bicyclists, and travelers on and within the City's transportation system and in the design of all improvements thereto.
n. Propose planned transportation projects for inclusion in the Six Year Capital Improvement Program and the annual Capital Budget.

o. Encourage joint public/private transportation improvement projects to support economic development and to allow the timely construction of highway improvements.

p. Continue to require traffic impact analysis in conjunction with applications pursuant to the City land use regulations.

q. Continue to require that new development bear a proportionate share of the costs for highway capital improvements, and shall be responsible for site-related improvements needed to provide safe and adequate access from the site to the arterial and collector street network.

r. Continue to update and administer a system of traffic impact fees to address off-site related impacts of new development on the existing and planned arterial and collector street network.

Policies related to Connectivity, Traffic Calming, and Access Management

s. Promote connectivity through the requirement of local street connections between existing neighborhoods and new residential developments as well as the encouragement of the interconnection of local streets between existing residential neighborhoods.

t. Implement traffic calming measures on local streets in residential neighborhoods and to direct traffic to arterial and collector streets in order to protect residential neighborhoods from adverse impacts associated with increased traffic volumes and speeds.

u. Implement access management guidelines for all functionally classified streets in order to provide safe and efficient access to abutting land uses and to maintain the operational characteristics of a roadway.

Policies related to Alternative Modes of Transportation

v. Coordinate the development at the Concord Municipal Airport with proposed highway improvement plans for the area, and in a manner consistent with the Land Use and Open Space Sections of this Master Plan.

w. Promote the implementation of the recommendations contained within the Airport Master Plan as most recently amended.

x. Continue to support the operation of the Concord Area Transit bus system including through the appropriate placement of bus stops and shelters in areas with high potential use as part of both public and private road improvements and the maintenance of bus shelters on a continuing basis.

y. Reserve a site for a future multi-modal transit station within the Opportunity Corridor in order to integrate both high-speed and commuter rail with inter-city and local bus services, taxis, off-street parking structures, and pedestrian and bicycle facilities.

z. Preserve existing rail corridors and to restrict any new at-grade rail crossings in order to retain capacity for future passenger and freight service.

aa. Reserve space for passing tracks, particularly on the New Hampshire Main Line (NHML), as well as freight yard space, and to plan transportation projects with due consideration of the requirements for heavy rail car weights (up to 286,000 pounds) and double-stack clearance.

bb. Continue to evaluate and designate truck routes within the city and implement restrictions and standards on through trucking.

<u>Policies related to Pedestrian and Bicycle mobility</u>

cc. Promote the inclusion of sidewalks in all highway improvement projects, ensure the proper provision for pedestrian access within developments, and provide for the proper integration of the public and private pedestrian ways.

dd. Ensure that pedestrian ways be designed to serve the needs of the handicapped.

ee. Give priority to the designation and improvement of walking routes to all local schools in the City.

ff. Incorporate provisions for bicycle lanes and/or paths in road construction and resurfacing projects, whether publicly or privately financed.

gg. Provide for winter maintenance of a designated network of sidewalks to ensure year-round pedestrian circulation

<u>Policies related to aesthetics of transportation infrastructure</u>

hh. Continue to require landscaping along the street edge in site development projects and a street tree planting and maintenance program as a requirement for new private roads

ii. Continue to support a street tree planting and maintenance as part of an improvement program for existing public roads.

jj. Continue to require as part of the City's land use regulations that utilities be placed underground in all new development, and in the redevelopment of existing commercial and industrial development when feasible.

kk. Promote the development of effective and aesthetically pleasing signage directing the traveling public to parks, recreation areas and other scenic and historic attractions; to regulate signs along at along the major travel corridors in the City in order to improve the

overall appearance of the City, especially at Gateways; and to reduce visual clutter in order to promote the safety of vehicles and pedestrians.

ll. Provide for visual and noise buffers along arterial and collector streets within or adjacent to residential neighborhoods.

2. Transportation Recommendations (Transportation Improvement Plan)

This Section of the Master Plan identifies improvements to the interstate, arterial and collector street system as well as major pedestrian and bicycle improvement plans. Improvements to the Concord Municipal Airport are addressed separately in the Concord Airport Master Plan. Rail and transit services are not provided by the City of Concord but major improvements such as commuter lots and a multi-modal transportation center can included once locations for the same are identified.

Improvements listed herein are categorized into short and long term improvements. Short term improvements are those already being needed or likely to be required in the next ten to fifteen years and most likely to be implemented in the next ten to fifteen years. Long term improvements are those which will be needed in the longer term to 2030 and beyond.

The Transportation Improvement Plan does not include maintenance or replacement capital projects and does not attempt to identify minor safety or geometric improvements or measures specifically designed for traffic calming purposes within residential neighborhoods. The Master Plan provides basic input and support for the City's Capital Improvement Program and Budget which is adopted annually by the City Council. Proposed improvements are shown on Exhibit VI-4, Highway Improvement Plan,

a. Short-Term Highway Improvements

Short term improvements (Table VI-2) are those identified as already being needed in 2005 or likely to be required in the next ten to fifteen years. Highway projects will include sidewalks, and shoulders/bicycle lanes as an integral part of each project. Bus stops will be provided where right-of-way can be acquired along transit routes. The classification of the improvements as short term, or long term is not intended to be an absolute ranking, as new development projects or funding opportunities will allow for or require the reorganization of priorities in this Plan.

b. Long Term Highway Improvements

Long term improvements (Table VI-3) are those most likely to be completed in the next 10 to 25 years. Major transportation projects such as I-93 widening through Concord take fifteen or more years for a consensus to be reached on the scope and extent of the project, to have it designed permitted and constructed. Relatively small transportation projects such as intersection improvements often take three to five years from the date of initial authorization to the date the improvement is completed. Highway projects will include sidewalks, and shoulders/bicycle lanes as an integral part of each project. Bus stops will be provided where right-of-way can be acquired along transit routes. The classification of the improvements as short term, or long term is not intended to be an absolute ranking, as new development projects or funding opportunities will allow for or require the reorganization of priorities in this Plan.

Table VI-2. Recommended Short-Term Highway Improvements

TYPE OF IMPROVEMENT	LOCATION	DETAILS
INTERSECTION		
	Centre/Liberty/Auburn Sts	Roundabout
	East Side Dr @Hazen Drive & I-393 Exit 2 east bound ramps	Realignment of Hazen Dr with east bound ramps
	I-93 Exit 16 / Mountain Rd/ East Side Dr / Shawmut St	Traffic Signal w/turn lanes or roundabout
	Manor Road @ Abbott Road	Roundabout
	S Fruit Street @ Memorial Field & NH Office Park South	Traffic Signal w/turn lanes
	S Main @ Broadway	Traffic Signal
	Storrs St @ North Main St	Traffic Signal
HIGHWAY		
	Loudon Road Corridor	• Conversion to 3-lane section from Airport Rd to Branch Tpk • New signal at realigned Branch Tpk & NE Village Rd • Pedestrian, bicycle, & streetscape improvements • Gating of Chenell Drive at Pembroke Rd
	Manchester Street Corridor	• Widening to 3-lane section from Garvins Falls Rd to Airport Rd • Widen to 4-lane section from Airport Rd to Pembroke TL • Realignment and signalization of intersection with Airport Road & Integra Drive • Pedestrian, bicycle, & utility improvements • Acquisition of ROW for 5-lane section
	North State Street from Washington to Bouton	• Roundabout at North State Street and Franklin St • Intersection improvements to Washington at N State • Elimination of southbound slip ramp at Bouton St Intersection • Traffic calming & streetscape improvements
	Route 3 North Corridor (N State St, Fisherville Rd, Village St)	• 3-lane sections at intersections • Signalization at East St, Washington St, Bog Rd, Sewalls Falls Rd, & McGuire St • Intersection improvements w/ turn lanes at Rumford St & Hutchins St • Corridor long bike lane • Pedestrian & streetscape improvements
	Sewalls Falls Bridge	Upgrade existing bridge / construct a new bridge to ensure 2-way traffic capacity

Table VI-3. Recommended Long Term Highway Improvements

TYPE OF IMPROVEMENT	LOCATION	DETAILS
INTERSECTION		
	Broadway @ West Street	Traffic Signal
	Clinton St @ Langley Pkwy	Traffic Signal
	Green Street @ School St	Traffic Signal
	Manchester St @ Old Suncook Road	Traffic Signal with turn lanes
	Old Loudon Rd (west end) @ Loudon Rd	Realignment with D'Amante Drive or Mall entrance, with turn lanes
	Pleasant St @ Warren & Fruit	Realignment
	S. Main Street @ Broadway	Northbound turn lane
HIGHWAY		
	Clinton Street	Widening to 4 lanes from Silk Farm Rd to Langley Parkway
	Connector from North Main Street to Fort Eddy Rd	Construct a new connector from North Main St to Fort Eddy Road which also links I-393, Storrs Street Extension, & Commercial St
	Garvins Falls Road	• Construct a connection from Garvins Falls Rd to Old Suncook Road Extension, and eliminate the Garvins Falls Rd connection to Manchester Street for all but the first few properties at its northern end • Intersection with Old Suncook Road southerly of Passaconway Club • Possible intersection or interchange with a Route 106 connector
	Hoit Road (Route 4)	Widen to 4 lanes west from Exit 17 to East St
	I-93	• Widening to (6) lanes from I-89 to Exit 16 • Interchange upgrades as necessary • Evaluation of new Exit 16 1/2
	Integra Drive	• Extension to Old Suncook Road Extension • Intersection improvements at Old Suncook Rd Extension
	Langley Parkway	• Construction of a 2-lane controlled access street from Pleasant St to North State St, including upgrade of Penacook St from Rumford to N State • Intersection improvements at Auburn, Penacook, and Rumford Streets
	Loudon Road	Widening from Route 106 to the east end of Old Loudon Road, with intersection improvements at Break O'Day Drive
	Old Suncook Road	• Extension southerly from Manchester Street
	Pleasant Street	• If Langley Parkway North is constructed, addition of a center turn-lane where necessary between Langley Pkwy and Fruit • If Langley Parkway North is not to be built, a widening of Pleasant Street to 4 lanes plus a center turn-lane will be necessary between Langley Parkway and Fruit St.

Table VI-3. Recommended Long Term Highway Improvements (continued)		
	Route 106 Connector	• Construction of a new link between Rte 106 at Rte 3 in Pembroke to I-89 or Hall St • Intersection/interchange improvements at Old Suncook Rd Extension • Intersection/interchange improvements at each end
	Sheep Davis Road (Route106)	Widening to 4-lane section from Autumn Lane to Pembroke TL (and to Rte 3 in Pembroke)
	Storrs Street	• Extension northerly to I-393 • Extension southerly to Langdon Ave
	Whitney Road	• Extension southerly as 2-lane collector road from current terminus to Sewalls Falls Rd • Signalization of intersection at Hoit Road • Addition of turn lanes at intersection of Sewalls Falls Rd

L. SUPPORTING STUDIES

Airport Master Plan Update, Concord Municipal Airport, Concord NH, prepared for the City of Concord, NH by Hoyle, Tanner Associates, Inc., May 2006.

City of Concord Master Plan Year 2010 Update, Concord Planning Board & Concord Planning Department, Concord, NH, December 15, 1993.

Concord Master Plan Community Survey, prepared by The NorthMark Group, 2004.

Concord Opportunity Corridor Master Plan, prepared for the City of Concord by the Cecil Group, Inc., with Rizzo Associates, Bluestone Planning Group, and Bonz and Company, March 2006.

Concord Area Transit Expansion Study, TranSystems Corporation and the Central New Hampshire Regional Planning Commission, September 2003

Concord Area Transit – System Evaluation, Vanasse Hangen Brustlin (VHB), Inc., April 1999

Existing Conditions: Concord Transportation Plan Update, Concord, New Hampshire, Kimball Chase Co. Inc., October 11, 1989.

Future Land Use Scenarios: Transportation Master Plan Update - Phase 2, Concord, New Hampshire, Kimball Chase Company Inc., August 1990.

Transportation Master Plan, Concord, New Hampshire, Summary Report, Vanasse Hangen Brustlin, Inc., December 2006.

Exhibit IV-4. Highway Improvement Plan

[Insert: 11 x 17 graphic]